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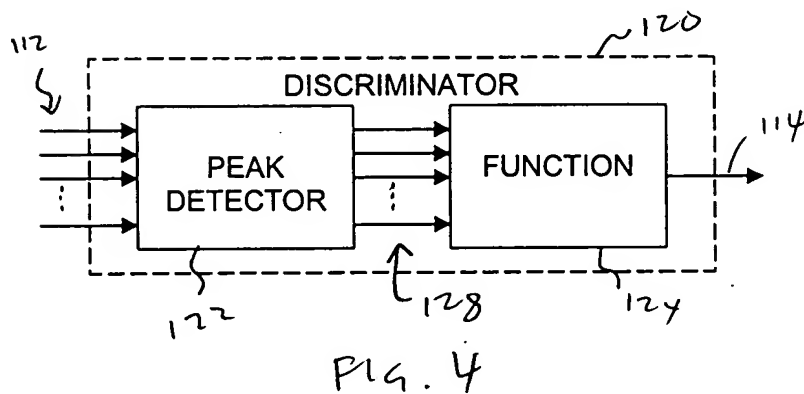
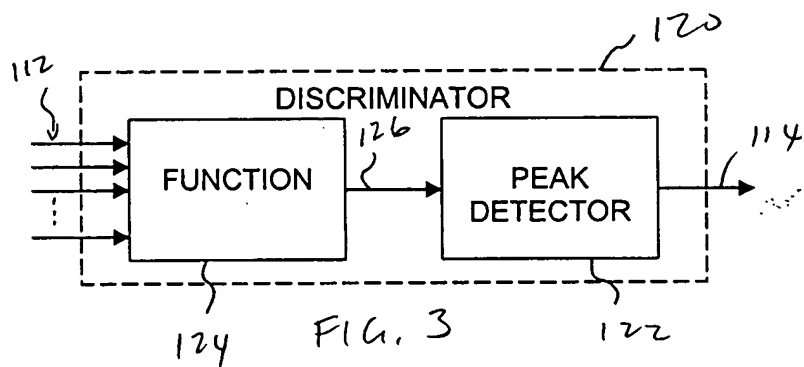
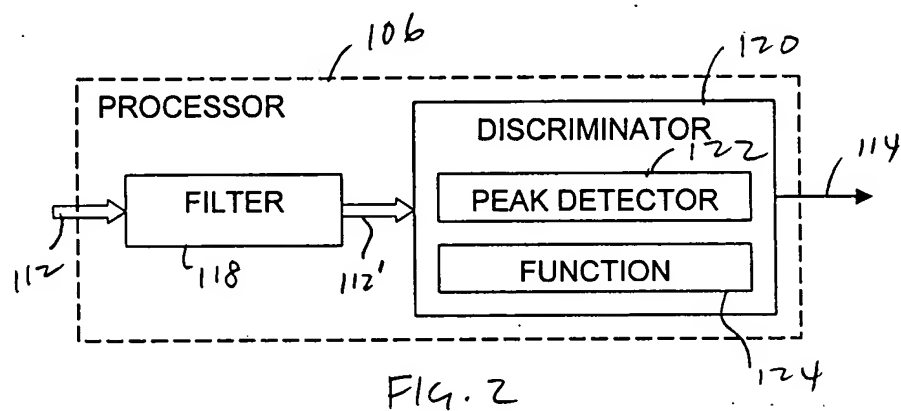
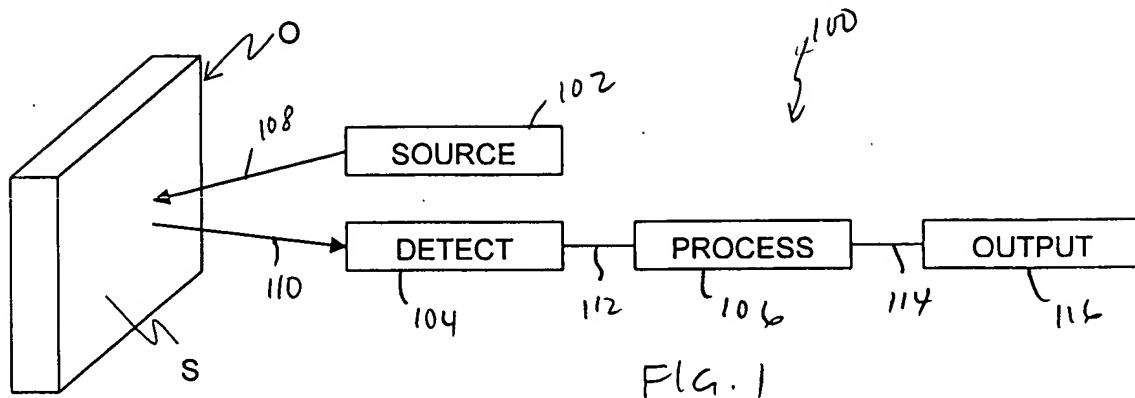
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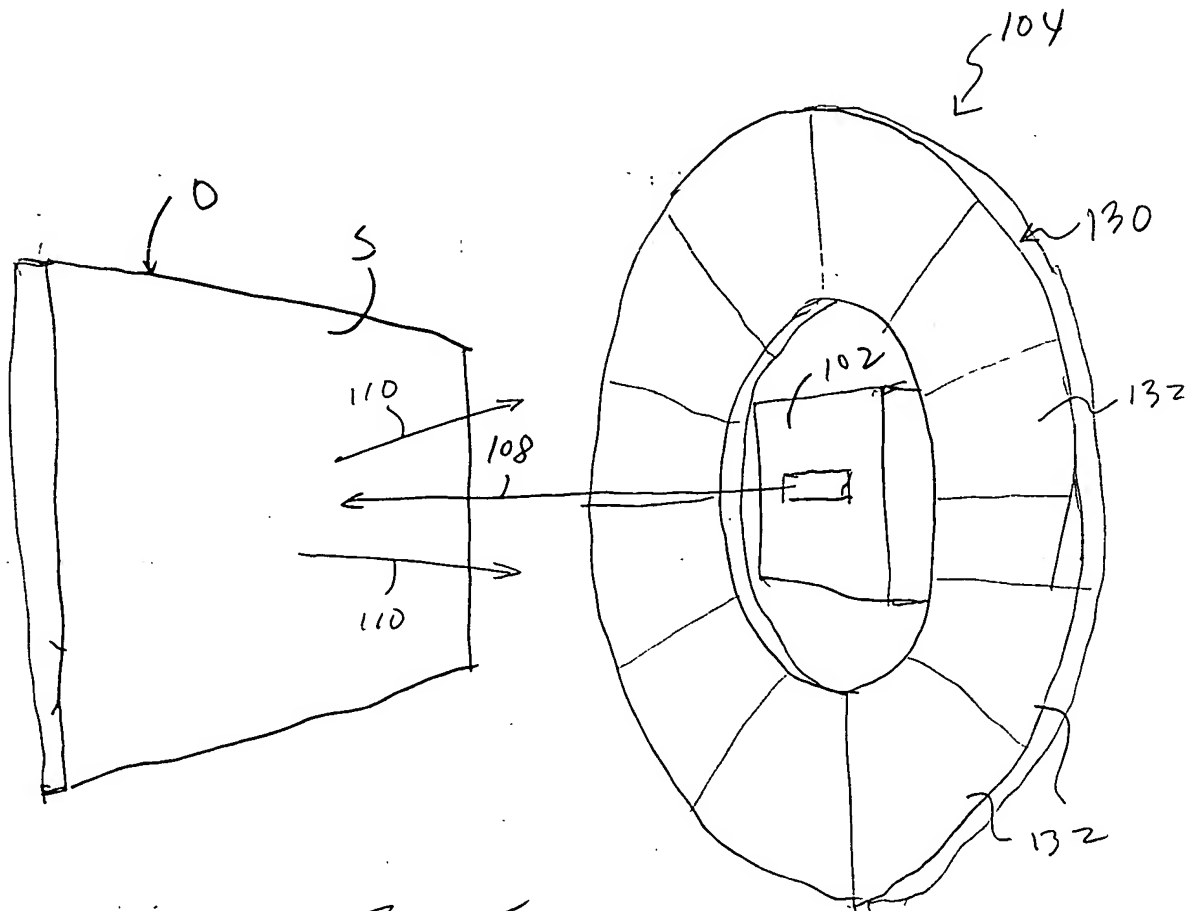


FIG. 5

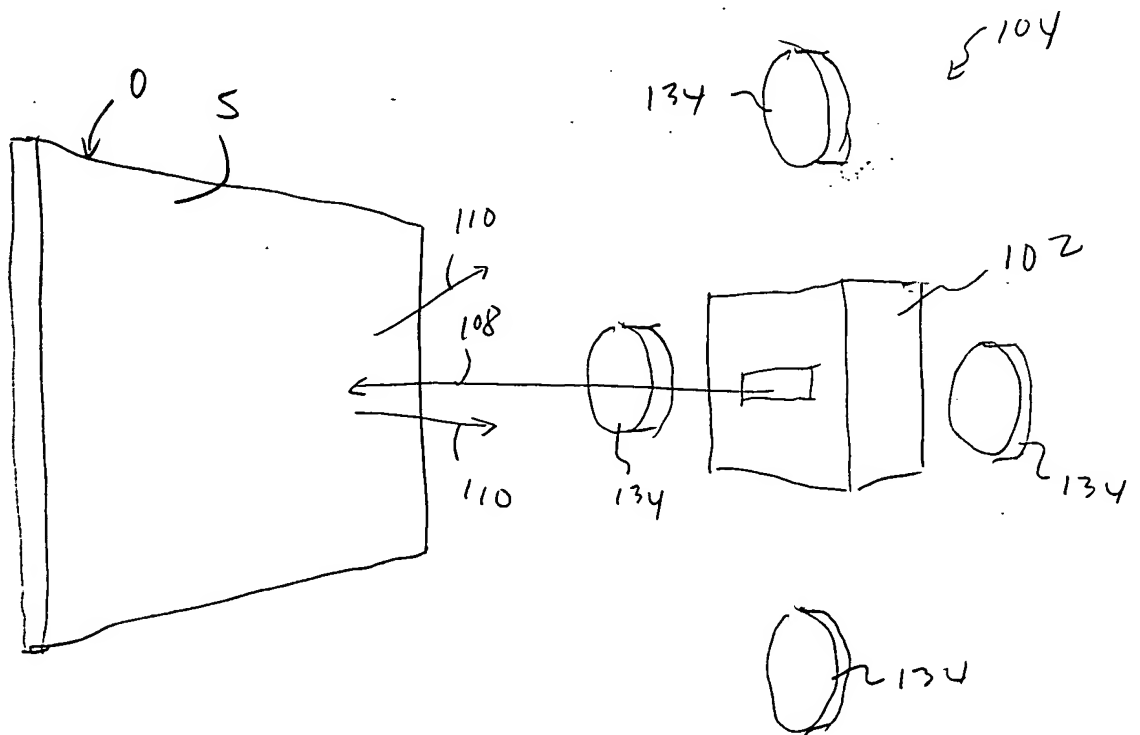
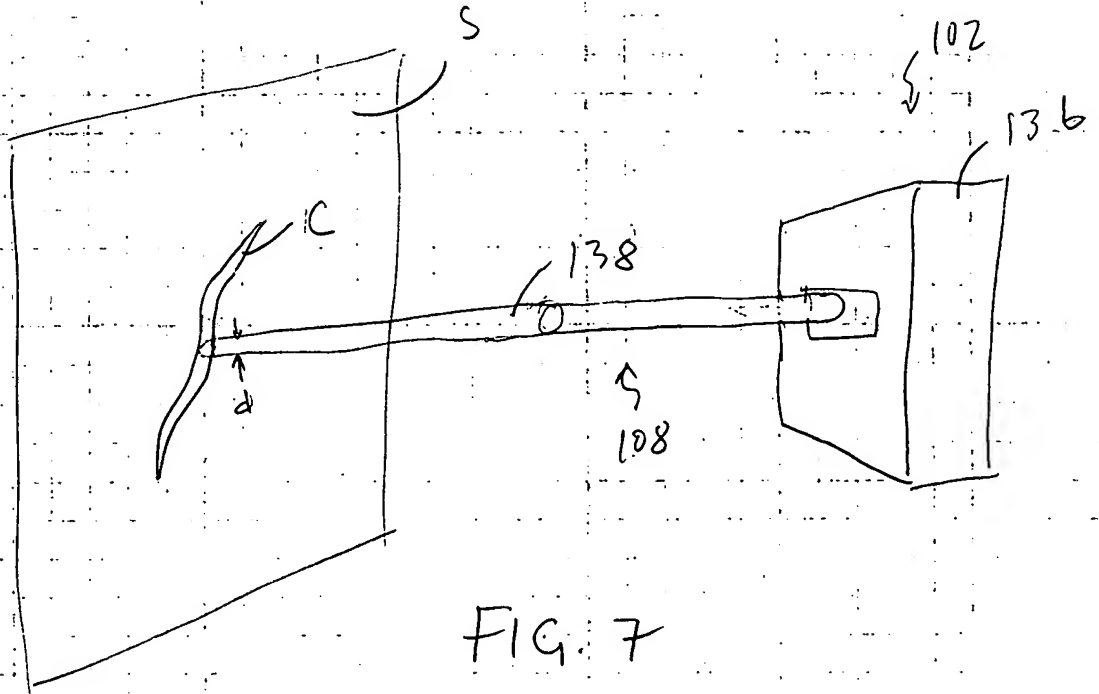


FIG. 6



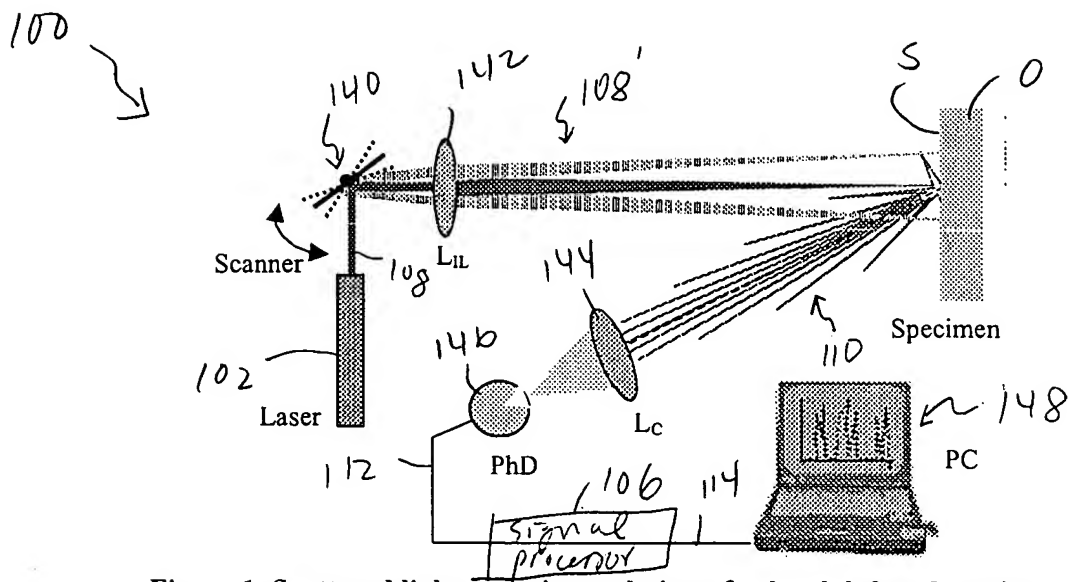


Figure 1. Scattered light scanning technique for local defect detection.

FIG. 8

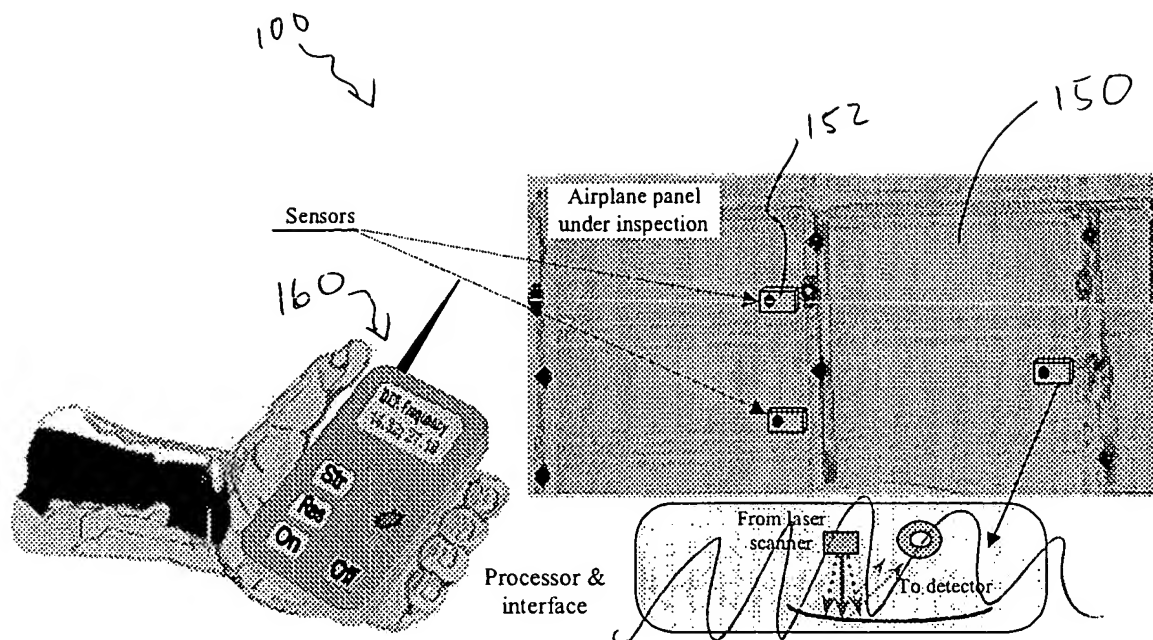


Figure 2. Fatigue inspection. The compact optical-measuring sensors attached to the airplane skin interface with a palmtop computer to catalog the measurements.

FIG. 9

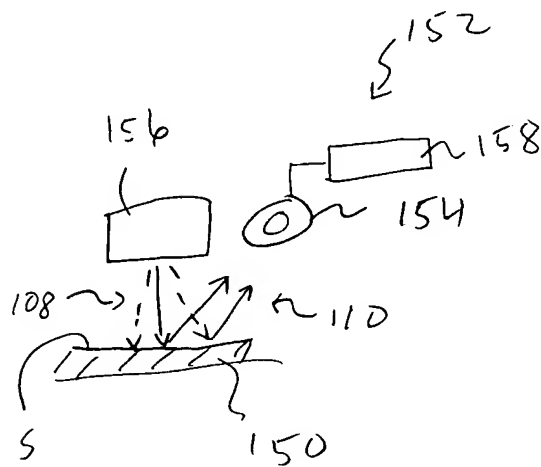


FIG. 10

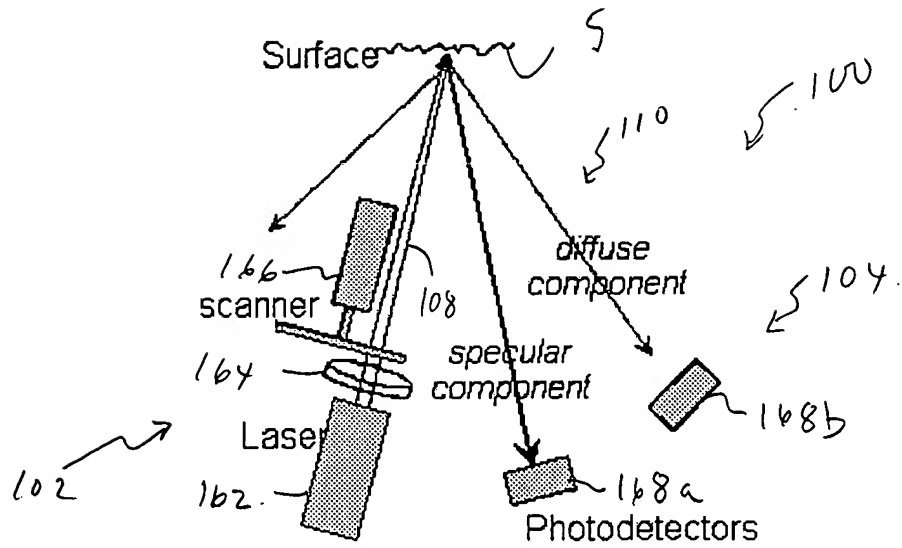


Figure 3. Surface scanning configuration used to determine residual stress relaxation in wires based on the laser scanning results of Schmidt and Earthman.

FIG. 11

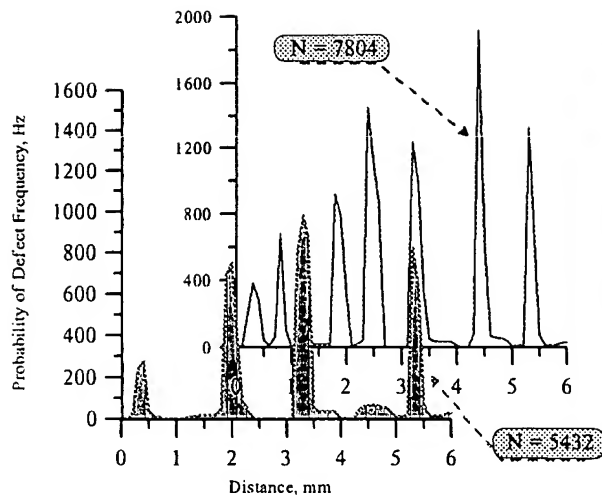


FIG. 12 (a)

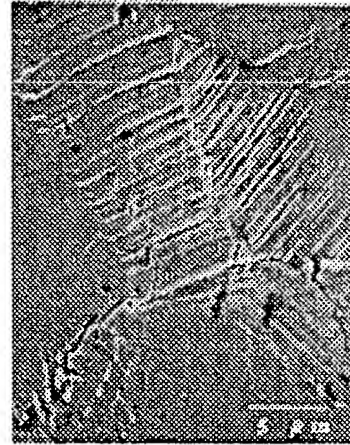


FIG. 12 (b)

~~Figure 4. The crack distribution along the test section at two different cycle numbers: (a) N=5432 and N=7804 and (b) SEM-micrograph of the surface.~~

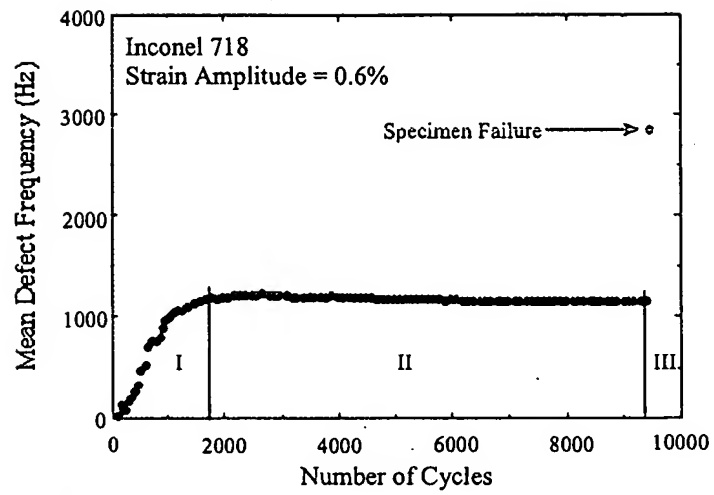


Figure 5. A typical plot of mean defect frequency versus number of cycles over the entire life of a specimen.

FIG. 13

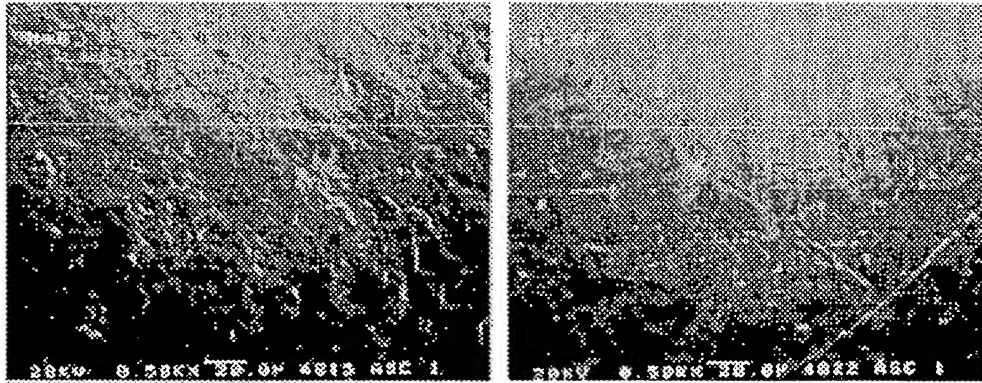


FIG. 14A

b) FIG. 14B

Figure 6. SEM-micrograph of: (a) the "as-drawn" surface of an wire specimen prior to fatigue testing, and (b) the surface of a wire specimen after 10,000 cycles of fatigue loading ($R=0.1$). The reduction in surface roughness after fatigue loading was easily detectable using a scattered light sensor as discussed in Reference 3.

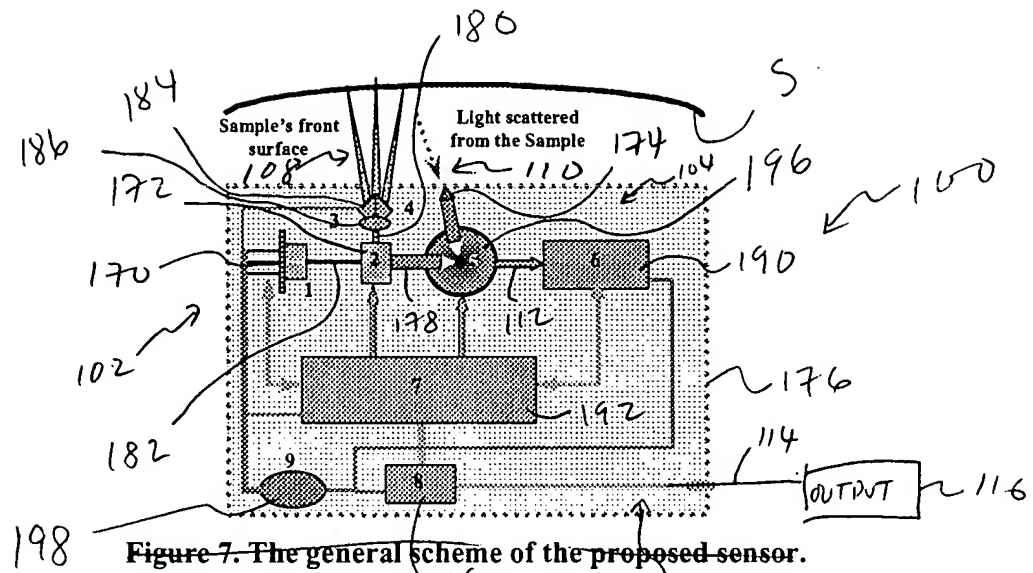
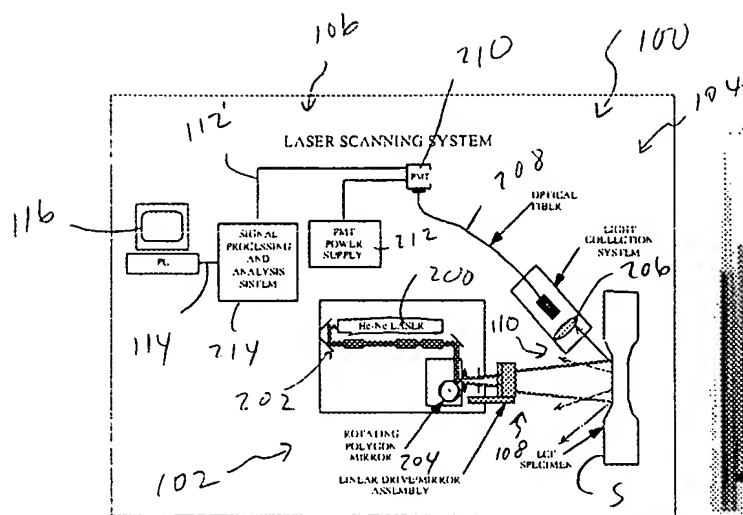
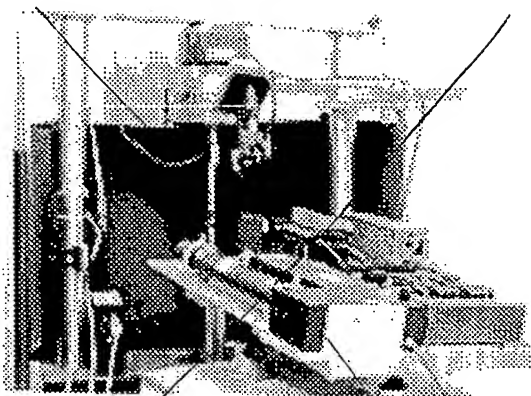


FIG. 15



(a) Laboratory Setup



(b) Schematic Diagram

Figure 8. Laser-scanning detection system.

FIG. 16